SECTION 15600

PLUMBING

1. REFERENCE PUBLICATIONS:

1.1 Some or all of the publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications shall govern.

1.1 Federal Specifications (Fed. Spec.):

WW-N-351C	Nipples, Pipe, Threaded.
WW-U-531E	Unions, Pipe, Steel or Malleable Iron; Threaded Connection, l50 Lb and 250 Lb.
WW-V-35B	Valve, Ball.

1.6 American National Standards Institute (ANSI) Standards:

A13.1	Scheme for the Identification of Piping Systems.
B16.21	Nonmetallic Flat Gaskets for Pipe Flanges.
B16.24	Bronze Pipe Flanges and Flanged Fittings, Class 150 and 300.
B40.1	Gauges-Pressure Indicating Dial Type-Elastic Element.

1.10 American Society for Testing and Materials (ASTM) Publications:

A 47	Malleable Iron Castings.
A 120	Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
A 126	Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
A 183	Carbon Steel Track Bolts and Nuts.

1.17 National Electrical Manufacturers Association (NEMA) Standard:

250	Enclosures for Electrical Equipment (1000 Volts Maximum).

2. GENERAL REQUIREMENTS:

2.1 Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in their manufacture. Items of equipment shall be the standard products of a manufacturer engaged in the manufacture of the products. Threaded joints shall have American National taper pipe threads conforming to Fed. Std. H28 with graphite or inert filler and oil, with an approved graphite compound, or with polytetrafluoro-ethylene tape.

2.2 Verification of Dimensions: The Contractor shall become familiar with details of the work, shall verify dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

2.4 Welding: Piping shall be welded in accordance with qualified procedures using performance-qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME Section IX. Welding procedures qualified by others, and welders and welding operators qualfified by another employer, may be accepted as permitted by ANSI B31.1.

3. MATERIALS:

3.1 Material shall be suitable for the pressures and temperatures encountered. Pipe, valves, and fittings shall conform to the respective publications and other requirements specified below.

3.2 Pipe and Fitting Material: Pipe material shall be equiv-ilent to the material currently in place and in use. Pipe fittings shall be compatible with the applicable pipe materials.

3.3 Flanges: Flanges shall be suitable for the required operating pressure and temperature conditions. Flange gaskets shall be fiber, plastic, or other synthetic material suitable for the service. Flanges shall be used on pipe sizes 3 inches and larger and shall conform as follows:

Description	Standard
Steel Pipe Line Flanges	MSS SP-44
Gray Iron Castings for Valves,	ASTM A 126

Flanges, and Pipe Fittings	

3.4 Pipe Nipples:

Description	Standard
Nipples, Pipe, Threaded	Fed. Spec. WW-N-351

3.5 Valves: Valves used for water service shall have the zinc content limited to 6 percent for the stem, body, bonnet, wedge, or disk in contact with the fluid and shall conform as follows:

Description	Standard
Cast-Iron Gate Valves, Flanged and Threaded Ends	MSS SP-70
Steel Valves-Socket Welding and Threaded Ends	MSS SP-84
Gray Iron Castings for Valves, Flanges, and Pipe Fittings	ASTM A 126

3.6 Pipe Jointing Materials, Gaskets:

Nonmetallic Gaskets for Pipe Flanges	ANSI B16.21

3.7 Water Pressure Gauges:

Gauges - Pressure and Vacuum Indicating Dial Type - Elastic Element	ANSI B40.1

3.8 System Schematic:

Scheme for the Identification of Piping System	ANSI A13.1

4. PIPE SUPPORTS:

4.1 Pipe supports shall conform to MSS SP-58 and SP-69, except as specified below. Metallic pipes supported on beams or brackets shall be provided with a graphite or polytetrafluoro-ethylene (PTFE) slide plate and cradle having a minimum thickness of 1/2 inch. Beam clamps shall be Types 20, 21, 22, 23, 28, or 29. A retainer shall be provided with Type 23. Angle iron or channel clamps shall be Type 20 with a malleable iron heel plate added.

5. GENERAL INSTALLATION REQUIREMENTS:

5.1 Pipe Supports: Pipe supports shall be furnished and installed in their proper and permanent location, as indicated on the contract drawings. The location of supports shall be coordinated with the structural work to assure that the members will support the intended load.

5.2 Welded Installation: Plumbing pipe weldments shall be as required. Changes in direction of piping shall be made with welding fittings only; mitering or notching pipe to form elbows and tees or other similar type construction will not be permitted. Branch connection may be made with either welding tees or forged branch outlet fittings. Branch outlet fittings shall be forged, flared for improvement of flow where attached to the run, and reinforced against external strains. Beveling, alinement, heat treatment, and inspection of weld shall conform to ANSI B31.1. Weld defects shall be removed and repairs made to the weld, or the weld joints shall be entirely removed and rewelded at no additional cost to the Government. Electrodes that have been wetted or that have lost any of their coating shall not be used.

6. VIBRATION ABSORBING FEATURES:

6.1 Mechanical equipment, including compressors and pumps, shall be isolated from the building structure by approved vibration absorbing features as necessary, unless otherwise shown. Each foundation shall include an adequate number of standard isolation units. Each unit shall consist of machine and floor or foundation fastening, together with intermediate isolation material, and shall be a standard product with printed loading rating. Piping connected to mechanical equipment shall be provided with flexible connectors.

7. PAINTING AND FINISHING:

7.1 After field welding has been completed, exterior seam surfaces shall be prepared, primed, and finished as specified. Painting of pipes, hangers, supports, and other iron work is specified in Section 09900, titled PAINTING.

8. TESTS AND FLUSHING:

8.1 Defective Work: If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. No calking of screwed joints or holes will be acceptable.

8.2 Operational Test: Upon completion of and prior to acceptance of the installation, the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory functional and operational efficiency. Such operating tests

shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system:

a. Time, date, and duration of test.

b. Water pressures at the most remote and the highest outlet within the irrigation system.

c. Operation of each valve, hydrant, and/or faucet.

d. Pump suction and discharge pressures.

e. Complete operation of each water pressure booster system, including pump start pressure and stop pressure.

******* END OF SECTION *******